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DISCUSSION PAPER

Institute of Agricultural Development in Central and Eastern Europe

LAND REFORM IN MOLDOVA: HOW VIABLE ARE EMERGING PEASANT FARMS? An assessment referring to a recent World Bank study

MARTIN PETRICK

**DISCUSSION PAPER No. 28
2000**



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ABSTRACT

Based on a case study of two Moldovan regions, the paper challenges the favourable assessment of recently established peasant farms in a World Bank study by LERMAN et al. (1998). The main arguments in favour of a more critical view of the results of land privatisation and farm restructuring are that a) private farmers produce only on a minimal fraction of land with almost no machinery or purchased inputs at all, b) the income of a typical farm household is below a poverty line based on national standards, c) private farmers face substantial production and marketing risks, d) at present, it is unlikely that short- or long-term investment projects in agriculture can be credit funded. Currently, peasant farms are mainly run to produce a minimum diet for the affiliated household. The situation thus gives little reason for rosy future perspectives concerning a market-oriented, commercial private agriculture.

JEL: Q 12, Q 15, P 36.

Keywords: Agriculture in transition, Land reform, Poverty, Subsistence farming, Moldova.

ZUSAMMENFASSUNG

Der vorliegende Beitrag setzt sich mit der positiven Bewertung neugegründeter Kleinbauernwirtschaften durch eine kürzlich veröffentlichte Weltbank-Studie von LERMAN et al. (1998) auseinander. Er beruht auf Ergebnissen einer Fallstudie von zwei moldauischen Regionen. Folgende Argumente sprechen für eine wesentlich kritischere Bewertung der Ergebnisse des Privatisierungs- und Umstrukturierungsprozesses: a) Private Kleinbauern produzieren lediglich auf einer minimalen Landfläche mit praktisch keinen Maschinen oder zugekauften Betriebsmitteln; b) das Einkommen eines typischen kleinbäuerlichen Haushalts liegt unterhalb einer Armutsgrenze, die auf nationalen Standards beruht; c) Private Kleinbauern sehen sich bedeutenden Produktions- und Vermarktungsrisiken gegenüber; d) die Wahrscheinlichkeit, dass kurz- oder langfristige Investitionen in der Landwirtschaft durch Kredite finanziert werden können, ist gegenwärtig gering. Zur Zeit werden private Bauernwirtschaften hauptsächlich zur Sicherung einer ausreichenden Nahrungsmittelversorgung der zugehörigen Haushalte betrieben. Die Situation gibt daher wenig Grund für Zukunftsaussichten, die eine marktorientierte, kommerziell betriebene private Landwirtschaft erwarten.

JEL: Q 12, Q 15, P 36.

Schlüsselwörter: Landwirtschaft im Transformationsprozess, Landreform, Armut, Subsistenz, Moldau.

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LIST OF ABBREVIATIONS

CIS	Community of Independent States
FAO	Food and Agriculture Organisation of the United Nations
MET	Moldovan Economic Trends
Tacis	Technical Assistance for the Community of Independent States
UNDP	United Nations Development Programme

1 INTRODUCTION¹

Privatisation and restructuring of collective farms in the Central and Eastern European Countries (CEEC) including those of the Former Soviet Union (FSU) has been one of the major tasks of transition in agriculture during the past decade. At the beginning of the 90's, many Western experts recommended to promote a strongly down-scaled, family-oriented agricultural structure in these countries. This recommendation was *inter alia* based on the successful restructuring of agriculture in other transition countries such as China and the apparently good performance of household plots during Soviet times, and was often connected with the promise of a rapid economic recovery of the sector in terms of gross output (see the more detailed review by LERMAN 1998).

Indeed, most countries quickly initiated reform measures in order to privatise state-property in agriculture and to restructure collective enterprises. However, up to now, expectations of a significant improvement of the economic situation in rural areas were not or only partly fulfilled (LERMAN 1999 and 2000; MACOURS and SWINNEN 2000). Instead, reform progress in agriculture was rather slow, and observers and decision-makers learned that the economic changes that had been triggered were much more complex in nature than thought at the beginning. Specifically, conjecture became a certainty that "individualization is not a sufficient condition of success", as LERMAN (1999, p. 275) put it. Currently, evidence more and more suggests that transition paths are highly country-specific, and that a careful analysis of success factors in a given environment is of utmost importance for further policy advice.

This paper provides a case study of the recent results of land reform and farm privatisation from two regions in Moldova. In the light of the ongoing debate on the viability of the newly emerged farm structures and the lessons learned so far from agricultural transition, the paper takes as a starting point the recent publication of LERMAN et al. (1998) on Moldovan agriculture. Though the country generally is way behind in the group of laggards of economic reform, private farming seems to perform well according to the assessment of these authors. An outline of the scientific debate and the views of LERMAN et al. are presented in Section 2. In the following Section 3, the current paper develops a different view based on own investigations, with primary attention towards resource endowment, factor use, income generation potential, risk exposure, and access to credit. It suggests a rather sceptical assessment of the viability of the newly established peasant farms and concludes with some recommendations on government policy and future research (Section 4).

2 BACKGROUND OF THE STUDY

2.1 Assessing privatisation and land reform in CEEC

As a result of the political decisions to move to a market economy system, the governments of the CEEC faced the major problem of privatising the means of production formerly held by the state. To structure the following discussion, we recall the central aims of this privatisation process (LAVIGNE 1999, p. 163): First, it generally was a *political* objective *per se* to redis-

¹ Parts of this paper draw on PETRICK (1998) and (1999). The empirical results presented in this paper are based on a mission carried out for the EU-Tacis project FDMOL 9503 in Moldova in 1997. I am indebted to K. Bader-Labarre of Agrarwirtschaftliche Beratung Göttingen GmbH (ABG) for facilitating the mission, and to S. Abele, K. Froberg, E. Schulze, and P. Weingarten for helpful comments on earlier versions of this paper. I take sole responsibility for the findings, conclusions and interpretations expressed in this paper, which may in no way be taken to reflect the opinions of the European Commission or of ABG.

tribute the state property and to create a new class of capitalists and entrepreneurs. However, in finding a mechanism to do so, *equity considerations* inevitably played a major role. Individual ownership of factors of production empowers the holders to generate and personally acquire incomes from these factors; the redistribution rules therefore had far-reaching consequences for the equality of wealth distribution and the access to income sources for citizens within a given country. Furthermore, privatisation was aimed at improving the *efficiency* of economic entities, since, in the presence of competitive pressure, ownership of resources creates incentives for private entrepreneurs to organise these entities in a productivity enhancing way.

In agriculture, the most important asset to distribute was land. Most governments in the CEEC therefore initiated land reforms in order to redistribute the former state-owned land.² To find an equitable way of land reallocation was a highly political question (see the recent analyses by SWINNEN 1997 and 1999). It witnessed the ethical conflict between the principle that land should be returned to those who were expropriated by the communists and the principle that it should belong to those who are actively farming it. The eligibility criterion essentially determined the resulting land-man-ratio in a given country, and therefore gave rise to a number of questions related to the economic viability of resulting ownership structures. These questions both concern equity and efficiency: On the one hand, the amount of individual land allotment highly determines the income generation potential for the holder. On the other hand, there may be economies or diseconomies of scale which make certain farm sizes superior to others. From an economic point of view, the central issue of land reform in the CEEC is thus whether a farm structure will emerge that is both efficient and creates sufficient income for the rural population.

Land reforms principally followed two different rules (for more details see CSAKI and LERMAN 1996 and 1997): those CEEC that were not part of the FSU plus the Baltic countries used a system of *restitution to former owners*. The remaining FSU countries usually *distributed* the land including farm assets *to its users* without payment (i.e. mainly to workers of the former collectives), although full individual ownership was not uniformly recognised. In Russia and Ukraine, joint ownership (though private) of the bulk of land seems still to be preferred (SCHULZE et al. 1999), while Armenia and Georgia are the forerunners within the FSU of a comprehensive individualisation process (LERMAN 1999 and 2000).

Today, ten years after the breakdown of the socialist system, the processes of privatisation and restructuring of agriculture are still in flux in many FSU countries, and a stable situation has not emerged yet. As a general tendency, most countries indeed experienced the development of a strengthened individual sector of small-scale peasant farms or increased household plots, while the successors of the large-scale collectives melted down in terms of farm sizes and members. This process is highly influenced by the relative emphasis with which individualisation was encouraged and pursued in the respective countries. While large-scale successors with an average size of several thousands of hectares often did not undergo substantial restructuring, peasant farms usually were newly created in a process of deliberate separation from the former collectives. Currently, most of the individual private farms are smaller than 10 ha (for details see LERMAN 1998).

Are these *de novo* peasant farms economically viable, and do they fulfil the hopes that were placed on the emergence of private farms as a backbone of future recovery in agriculture?

² Exceptions were the cases of Poland and Yugoslavia, where land never was fully nationalised or returned to the farmers already in the 1950's. The six Central Asian republics of the FSU do not recognise private ownership of land.

Recent evidence draws a mixed picture. After a decade of transition, most Western analysts still agree that farm sizes that can be handled by a family are the most efficient ones – similar to what can be found in both industrialised and developing countries (BINSWANGER et al. 1995). Also for the CEEC, there is preliminary evidence that individualisation of farming operations has a positive effect on efficiency (MACOURS and SWINNEN 2000; SARRIS et al. 1999). This view is supported by a body of theoretical literature, which emphasises the relative advantages of family farms in labour supervision and in coping with randomness and seasonality of natural events, and limited economies of size in agricultural production (e.g. ALLEN and LUECK 1998; SCHMITT 1991 and 1993).

More controversial is the question whether the current structures allow the generation of sufficient income for the rural citizens. This is firstly determined by the resource endowment of farms. More resources, i.e. bigger farms, imply more income generation potential for the owners. For SARRIS et al. (1999), the future therefore lies in “a viable ‘middle class’ of commercially oriented private individualistic farmers”, who may be “the best prospect for agriculture in the CEECs” (p. 325). The argument is that farms should be big enough to generate a sufficient income and to produce at constant or decreasing returns to scale, but small enough not to exceed the labour force capacity of a family. However, in most of the FSU countries exactly this ‘middle class’ is apparently lacking, in other words, many private farms are likely to be too small to be economically self-sufficient. Accordingly, CSAKI and LERMAN (1996) postulate that (p. 230)

“...the desirable farm size and form of farming must be capable of generating self-sustainable profits without subsidies or with relatively little support. These farm sizes almost certainly will be many times larger than the average size of private farms in East Central Europe today (2–10 hectares), and possibly larger than farm sizes in some of the Western European countries.”

This argument, however, overlooks a second determinant of farm family income, namely the existence of off-farm employment opportunities. This may indeed allow the viability and persistence of farm sizes that would be regarded as inefficient and too small otherwise (SCHMITT 1988 and 1991).³ However, in most of the countries concerned, rural non-farm income sources are rarely available.

Generally, land reform is not the only precondition for the emergence of a viable private agriculture. CSAKI and LERMAN (1997) have pointed to other essential requirements such as liberalised markets, a stable institutional framework, and availability of rural finance. Many of these requirements are still not given, and SARRIS et al. (1999) admit that many of the new private farmers are “currently very constrained on most fronts, both technological and financial” (p. 325). The risk-prone economic environment is probably a major reason for the slow process of individualisation in several countries (CSAKI and LERMAN 1997, p. 450):

“Political uncertainty, lack of clarity in design of programmes, and macroeconomic instability create a risky environment for private farming, while basic instruments such as secure savings and insurance are missing. Instead of establishing independent private farms, participants in land reform and farm restructuring are likely to choose to remain within larger units, where cooperative arrangements provide a measure of insurance against risk.”

Hence, a comprehensive assessment of farm viability has to take factors such as risk exposition and access to certain services into account.

To obtain conclusive results on these issues, a promising way is to systematically collect relevant data on farm performance and to study the impact of land reform on the micro level in a

³ ‘Inefficient’ is used here to mean a suboptimal locus on the average cost curve in the sense of the neoclassical theory of the firm. This theory may however be irrelevant for agricultural producers, as has been emphasised by SCHMITT.

given country. The World Bank has done this for a number of countries, notably for Russia, Ukraine, and Moldova, and the results are particularly worth mentioning due to their favourable assessment of the emerged private farms (LERMAN 1998). The approach was to interview both collective farm members and *de novo* peasant farmers about their living and production conditions, assessment of the reform process, etc. The general finding was that “farmers are better off and more optimistic than employees of collective enterprises” (p. 327). This means that farmers indicated a more satisfying standard of living, that they valued the changes that happened in the past years, and that they were more optimistic with regard to the future. The results are however likely to be qualified by a selection bias, namely that particularly those farmers left the collectives who already prior to their exit were more optimistic and better educated, had certain connections, and were therefore a posteriori the more successful ones. Cause and effect are thus difficult to distinguish.

But even if this is not regarded, do the results imply that the new private farms really provide a sufficient livelihood for their owners, that they are indeed viable in the longer run, and that they open development perspectives for the rural economy?

In the following, this is examined for the case of Moldova. This country is particularly outstanding due to, on the one hand, the enormous importance of the agricultural sector for the national economy as a whole, and, on the other hand, the extremely small size of *de novo* peasant farms. In subsequent paragraphs, the findings of the World Bank as presented by LERMAN et al. (1998) are briefly summarised, and the further plan of the study is elaborated.

2.2 The appraisal of peasant farming in Moldova by LERMAN et al.

In a recent World Bank publication, LERMAN et al. (1998) present a comprehensive assessment of the situation of *de novo* peasant farms in Moldova. These farms were set up by former employees who left the collectives with their share of assets in the process of privatisation.⁴ Based on an extensive micro-level survey of farm managers, employees of farm enterprises, and private farmers from all over Moldova conducted in the first half of 1997, the authors draw a number of quite favourable conclusions concerning the actual situation of private farmers. In the executive summary, they state that (p. xviii)

“the survey reveals a highly positive impact of private farming on the well-being of the families of private farmers. Both quantitative financial data and qualitative individual assessments clearly divide the rural population into losers and winners in the process of reform. Large farm enterprises and their member-employees are much worse off as a result of the recent economic and organizational changes. Private farmers, on the other hand, are the clear winners: they are happy, optimistic, and relatively prosperous [...]. This dichotomy between the conservative and the reform-minded provides a clear incentive for Moldovan peasants to leave the collective and strike on their own as independent farmers.”

This favourable assessment of private farming is substantiated by a number of arguments which are set forth in later chapters of the monograph. On pages 84 and 85, the authors refer to an above-average income of private farmers, which includes home consumption of products and draws on survey results. According to their calculations, the monthly per capita income of an average farm amounts to 300 lei, which equals around 65 US\$. This is claimed to be significantly higher than the average salary in Moldova, although standard errors are generally not given. In Table 6.19, p. 85, LERMAN et al. report an average yearly profit of 660 lei (150 US\$) for the average farm, which is calculated as sales revenues minus purchased input costs. The authors expound that, according to the responses, producers are quite optimistic con-

⁴ The legal framework of privatisation of Moldovan agriculture is summarised in DUMITRASHKO and KAINARJAN (1997) and DUMITRASHKO (2000).

cerning their farms' future profitability. Figure 6.8, p. 84, reveals that standards of living of peasant farms definitely outperform those of large farm employees when indicated on a qualitative four stage measure "What the Family Income Buys?", and Figure 6.10, p. 85, tells the reader that nearly 50% of all respondents expect a positive change of the family situation within the next 2-3 years (compared to 14% on the collectives, p. 61). Furthermore, as explained earlier in their monograph, the authors found that Moldovan private farm entrepreneurs show a "definite commercial orientation" (p. 81). This is based on the result that 80% of all producers sell at least one farm product – a criterion that makes the aforementioned conclusion questionable.

LERMAN et al. particularly aim at contrasting their evaluation of private farming with the situation of employees of large-scale farms. The authors conclude from the findings that, since the latter are uniformly worse off than private farmers, dismantling of former collectives should be continued without compromise (p. xxi). Again, this conclusion ignores the likely selection bias that is inherent in the decision to exit the collective, and well-being of rural citizens might be more significantly determined by other factors than ownership structure and the organisational form of farming.

2.3 Objectives and data sources

In the light of the discussion on the viability of emerging farm structures as outlined above, it seems worth scrutinising these results of LERMAN et al. In fact, there is empirical evidence that the picture of flourishing private farming in Moldova might be too optimistic. Therefore, the current study attempts to qualify the statements of LERMAN et al. and challenges their assessment of the situation in the country. The study, however, does not aim at reviewing the comparison of living standards of private farm families vs. member-employees of collective farms. It rather seeks to evaluate the viability of peasant farms with regard to principal factors of income generation potential, sustainability, and market access. Though the present study critically analyses some results of LERMAN et al., it mainly aims at complementing them by looking at the situation from a different perspective.

The items to be investigated more closely draw on the discussion above and are as follows:

- an evaluation of resource endowment and technology utilisation in private farming;
- a review of the income situation of private farm households;
- an analysis of risk exposure;
- an examination of private farmers' access to credit.

These items will be discussed in sequence, leading to a more differentiated and, compared with the study of LERMAN et al., less clear-cut assessment of private farming in Moldova. The discussion is based on own empirical data collected in the country in the same year.

The data-set forming the basis of the following reasoning was collected in the framework of an empirical case study as part of an EU-Tacis project on the development of credit for small private farmers. This case study was carried out in 1997, by administering a questionnaire to private farmers in 13 villages of two selected regions in the country, namely Causeni and Orhei in the central district. These two regions are among the most advanced in terms of privatisation and restructuring of agriculture. The results for both regions were synthesised into one sample, the total number of respondents to the questionnaire was 107. The criteria for selecting villages were the share of private farmers in the number of all persons working in agriculture, and the organisational form of the farms (either independent or from associations).

Since exact data on village structures was not available at the time, a somehow arbitrary effort was made to find villages that are typical in terms of the extent and organisational status of private farming. It is important to mention that the results of this survey are not necessarily significant for whole Moldova. But they provide a particularly detailed insight into the situation of the regions under investigation and therefore may utilise a certain strength of the case study method: "One of its special values is that it frequently shows the limitations of conventional wisdom, particularly incorrect stereotypes of rural life and activities which have often affected development policies in the past" (CASLEY and LURY 1981, p. 70). Additional information was collected by interviewing key informants from the government administration, farmers' associations, banks, and several development projects, as well as in group discussions with farmers, participant observation in the villages, and documentary research both in the capital and the regions.

3 ON THE VIABILITY OF PEASANT FARMS IN MOLDOVA

3.1 Analysis of resource endowment and production activities

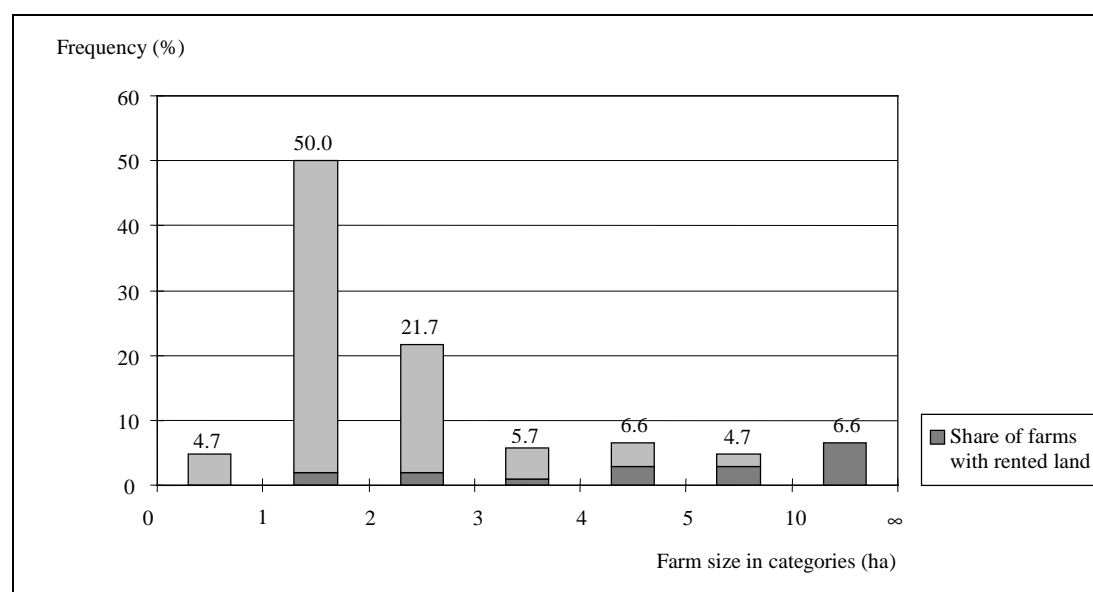
Available resources and technology are decisive for the efficiency and the income generation potential of farms and highly determine their future development perspectives. The following paragraphs examine the structure of land holdings and the availability of machinery and buildings, and analyse the most important production activities in Moldovan private agriculture.

3.1.1 Structure of land holdings

The distribution of farm sizes in the sample is presented in Figure 1. Although the average farm size of the sample is about 4.75 ha, three quarters of the considered farm holdings are smaller than 3 ha. The median farm cultivates 2 ha, which should be regarded as typical for private farms.⁵ Although a few private farms larger than 10 ha exist, they are the exception. Much of the land they farm is rented.

Roughly 17% of all farmers in the sample have rented land (Figure 1). It does not surprise that the share of farms with land rented does increase in each class with an increasing total farm size. In the class larger than 10 ha all of the surveyed farms have land rented, whereas an additional calculation reveals that in the category smaller than 3 ha less than 5% of all farmers rented any land. The average farm with land rented covers around 18 ha. However, the large share of rented land compared to the whole land cultivated by private farms in the survey is remarkable (52% of the land is cultivated by 17% of the farms). Few farmers have rented much, while the majority are smallholders who work solely on their own land.

⁵ In fact, the size of individual land allotment in the regions visited is smaller than the Moldovan average (MET).

Figure 1: Distribution of farm sizes and renting in the sample

	all farms	only farms with rented land
Average ha	4.65	17.81
Average deviation ha	4.74	17.77
75-percent quantile ha	2.95	
Median ha	2.00	7.75
Share of farms with rented land (% of all farms)		16.98
Share of rented land (% of total land of farms surveyed)		51.77

Note: Farm size classes defined as follows: 0-1.00 ha; 1.01-2.00; 2.01-3.00 etc.; 10.01 and bigger.

Source: Own calculations from survey.

Suppliers of land for lease are district councils that started to lease out their public property land. Other sources are pensioners who are not able to cultivate the land on their own. The rent paid varies from 150 to 600 Lei/ha, although cash payment was used only in 25% of all cases. Usually a portion of the harvest is given to the land-lessor, varying from 20 to 60% of the yield of the rented area.

Selling and purchasing of land has been largely prevented by government legislation so far. The initial convention that passed parliament in 1991 included a moratorium on land sales until 2001. This was amended in July 1997, when a 'Law on the Normative Land Price' was approved, which should enable private owners to buy state-owned land at a regulated price. However, no transactions took place in that year, and only about 1,000 ha were sold in 1998, at a price varying from 250 to 700 US\$ (according to DUMITRASHKO 2000). So far, it is not legally possible to use land as collateral (MET).

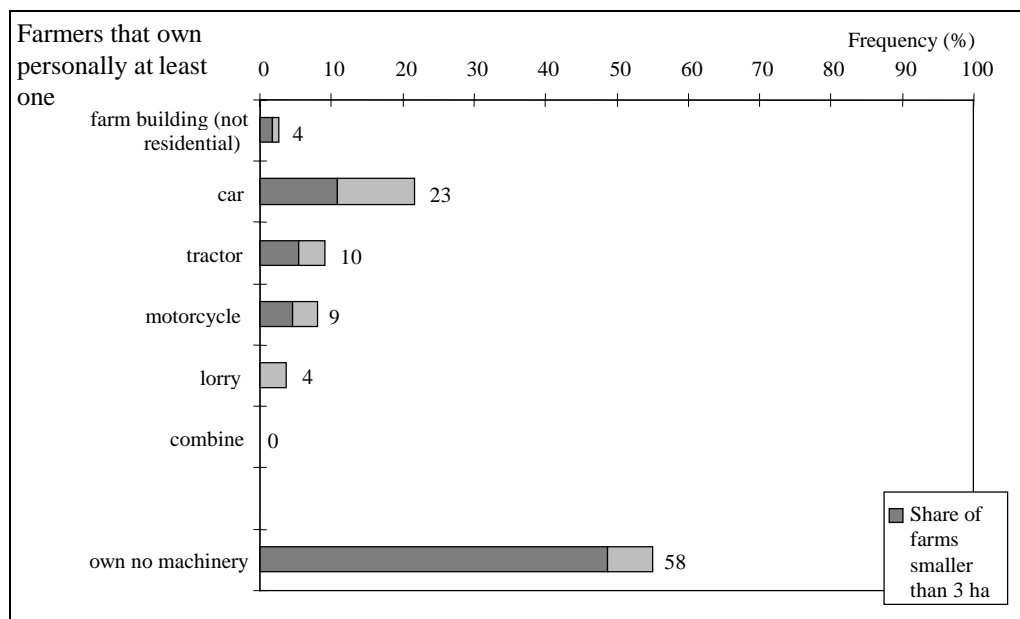
Only one of the respondents indicated lack of land as a major problem. So currently the desire for expanding the farm size seems to be of limited importance. The farmers are obviously more concerned about solving the problems related to the cultivation of the land they already have than thinking about increasing it. This attitude may partly be attributed to the fact that, despite the small farm sizes, plots are often highly fragmented, with the effect of major transportation problems. It also suggests that interests in commercialising production activities and entrepreneurial ambitions aiming at increased farm sizes seem to be not very widespread.

In summary, there is a large number of small farms without land rented, and a marginal number of large, probably growing farms which mainly rent their land. However, renting of land generally occurs rarely. As the following paragraphs show, land is the only asset that all farmers are really entitled to make full private use of. Even of this most important asset, the vast majority of farmers has available only a comparatively small fraction, around 2 ha. Their production base must therefore also be regarded as being very small.

3.1.2 Availability of machinery and buildings

During the process of privatisation of the former state farms the machinery and buildings were divided among the new private owners. However, the condition of the available machinery and the ratio of machinery for distribution to persons with a claim to this machinery were such that almost none of the private farmers received any working machinery (Figure 2). The same applies for buildings. If at all, people own a car, which is only of limited value for agricultural field works. Not more than one out of ten farmers owns a tractor. On the other hand, a tremendous need exists for additional machinery due to the bad condition of most of the available equipment. Organisational problems of machinery and transport supply frequently lead to a delayed execution of field operations.

Figure 2: Private ownership of buildings and machinery



Note: Joint ownership not regarded, multiple answers can total over 100%.

Source: Own calculations from survey.

Nevertheless it is still common and possible for private farmers to mechanise at least some of their field operations, which is done by hiring. In the sample nearly all of the respondents (96%) *used* machinery, i.e. either own equipment or, more often, machinery services from others, which is however expensive. Independent farmers hire machinery either from associations or from other farmers in the village.

As a result of the general shortage of working machinery and high prices for hiring, most farmers confine themselves to using machinery only for ploughing, preparing the soil, sowing and transport. The latter is often done by cars and motorcycles, too. Hoeing and all other field operations are normally done manually. If not only produced on a backyard-scale, wheat, barley and sunflower is harvested by (mostly hired) combines. Maize, vegetables, fruits and

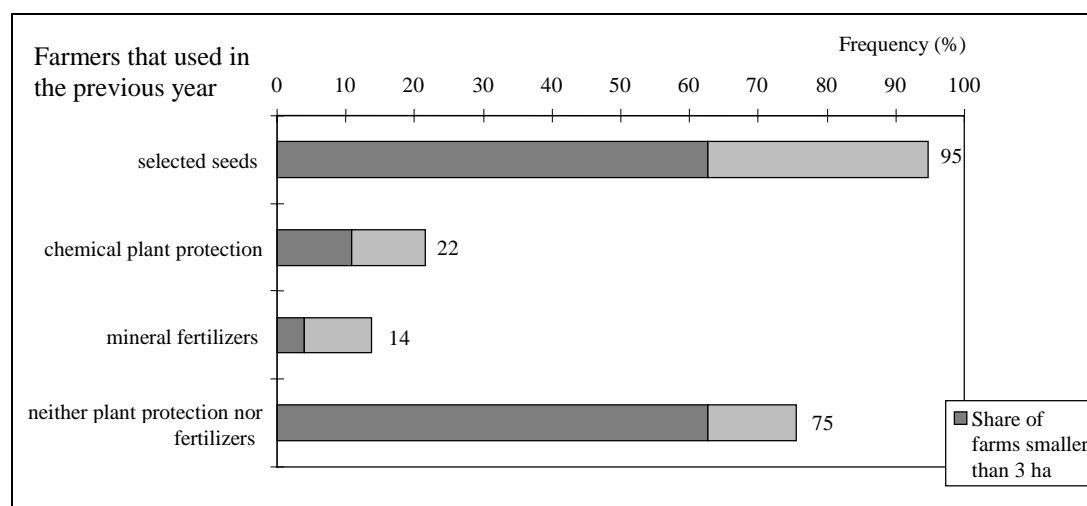
grapes are normally harvested manually. 42% of the respondents indicated limited access to machinery as a major problem in their farm business, which was the most frequent response to this question. Especially small farms are affected by the lack of own machinery, since most of the farmers who do not own any machinery (including cars and motorcycles) work on less than 3 ha.

In summary, for most private farmers machinery is scarce and expensive. It might therefore be rational to rely more on manual work and/or to establish a sort of machinery service cooperative. The former is in fact widely practised, while the latter so far did not get beyond some pilot projects initiated by foreign assistance. A problem here is probably the bad experiences made with ‘cooperation’ during Soviet times. Field works therefore often cannot be done in due time, which was indicated by 15% of farmers as their most important constraint, and farmers are posed major transportation and logistical problems.

3.1.3 Use of purchased inputs

The use of purchased inputs like mineral fertilisers, pesticides and improved seeds is very limited in private farming. Only one quarter of all respondents used fertilisers or chemicals at all (Figure 3). The share of farms smaller than 3 ha that used neither plant protection nor fertilisers is considerable, it reaches 85% (i.e. the dark part of the fourth bar in the figure).

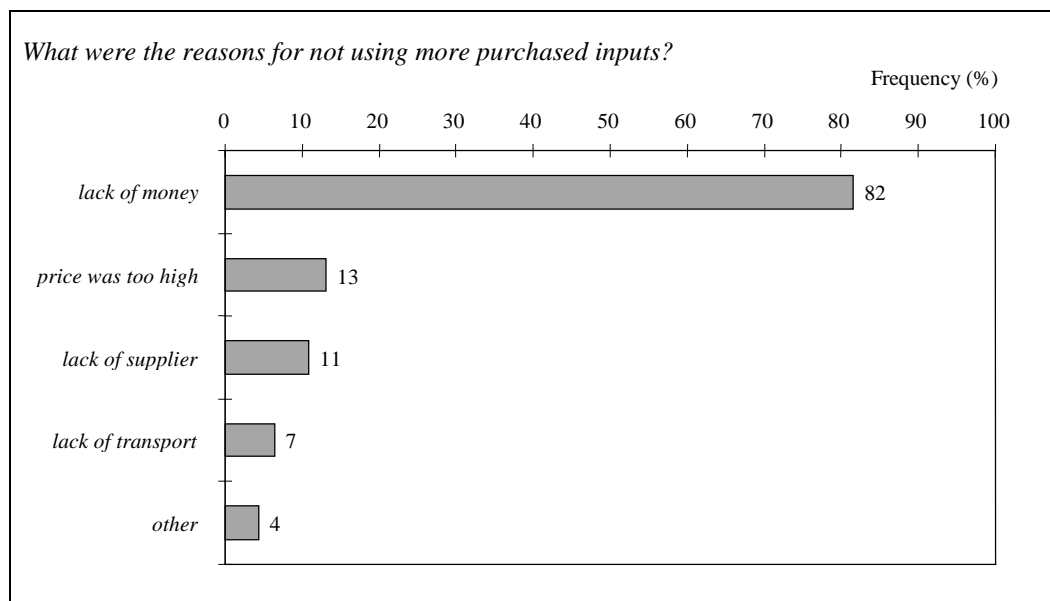
Figure 3: Use of seeds, fertilisers and chemicals



Note: Multiple answers can total over 100%.

Source: Own calculations from survey.

The relatively frequent use of selected seeds is due to the widespread cultivation of maize for which hybrid seeds are normally used even by small farmers. In addition, they possibly appreciate the impact of plant protection on their yield more than that of fertilisers, which explains the less frequent use of fertilisers compared with other chemicals. This may be especially true for orchards and vineyards.

Figure 4: Reasons for not using purchased inputs

Note: Multiple answers can total over 100%.

Source: Own calculations from survey.

Figure 4 presents the reasons farmers mentioned for not using external inputs in a larger amount than they do currently. Financial difficulties are obviously the main obstacle hindering this. On the other hand, farmers are willing to expand the use of these inputs, provided they had some. This means that chemicals and fertilisers are commonly regarded as necessary for an enhanced crop production.

It is presumably due to lack of information or limited supplies that the prices for seeds and chemicals vary even between different villages. The sources for these inputs are normally, directly or indirectly, the formally privatised former state suppliers like 'SOSK' in Causeni, 'Cereale' in Orhei or 'Porumbeni' (maize seeds).⁶ Some of the farmers obtained them from ex-kolkhozes in their village or farmers' associations buy them centrally. However, finding a supplier was a minor problem for the farmers (Figure 4).

Bad seed quality was mentioned by a few farmers interviewed in the case study. For crops other than maize, very often, own seeds from previous years are sown. Part of the seeds is cleaned with suitable equipment on the former state farms.

Diesel oil is sometimes bartered with other farmers but more often bought directly at the filling stations in the towns when the machines are used. This is due to the fact that most farmers cannot store fuel. At present diesel oil is regarded as being expensive but available.

3.1.4 Gross margin analysis of production activities

The efficiency of factor use in Moldovan peasant agriculture is difficult to assess. Since the available data is not sufficient to estimate production functions, a more refined analysis of technical or allocative efficiency based on quantitative methods is not possible and marginal revenues of production factors are unknown. Comparing the results of Figure 3 with successful farming in comparable regions of the temperate part of the world, it must however be

⁶ Though formally privatised, most of these companies still work according to the socialist *modus operandi*, i.e. they are geared to the needs of large-scale farms. Only recently did some of them recognise private farmers as a new market segment.

Table 1: Resources and activities of a typical peasant farm

Labour equivalents		4.00	
Activities and assets of farm			
		Cattle	2.00 heads
Maize	1.00 ha	of which milking cow	1.00 head
Wheat	0.30 ha	Home gardening	0.30 ha
Apples	0.30 ha	Tractors	0.00
Grapes	0.40 ha	Other machinery	0.00
Agricultural land total	2.00 ha	Residential building	1.00

Gross margins of production activities		Profit and loss account	
Maize	549.50 lei/ha	Gross margins	
Wheat	585.00 lei/ha	Maize	549.50 lei
Apples	1,260.00 lei/ha	Wheat	175.50 lei
Grapes	1,378.00 lei/ha	Apples	378.00 lei
Dairy	1,686.50 lei/head	Grapes	551.20 lei
Cattle for fattening	509.00 lei/head	Dairy	1,686.50 lei
		Cattle for fattening	509.00 lei
		Farm gross margin	3,849.70 lei
		Operating overheads	-475.00 lei
		Operating farm profit	3,374.70 lei

Source: Own calculations based on case study results. For detailed calculations and sources see appendix.

noted that fertiliser and chemical application is very low at present.⁷ This is not necessarily a sign of technical and/or allocative inefficiency, since a low level of purchased input use may be rational according to prevailing input/output price ratios. The results of Figure 4 however suggest that a lack of finance and not the high price is the decisive reason for little use of purchased inputs. As will be shown in Chapter 3.4, farmers indeed face severe obstacles in obtaining credit.

Profitability of production activities is a necessary condition for efficiency. Since its measurement is also less data demanding, it will be pursued in the following for the most important production activities in Moldovan agriculture. This is done by using gross margin calculations according to the following formula:

Gross margin = physical output * output price – variable costs.⁸

The gross margin is usually related to one unit of production factor (i.e. one hectare or one animal).

In the following, the concept of a ‘typical farm’ is used in order to analyse the economic viability of peasant farms. This approach is followed because of lack of sufficiently detailed cross-sectional data on farm performance. Calculations are related to average prices, expenditures, yields, etc. recorded in the case study, and therefore represent an average farm based on the available information. Resources and gross margins of this farm are presented in Table 1, for details see the appendix. As is shown, the farm principally has available four full time labour equivalents, which is a usual household size (UNDP 1996). Two hectares of land are

⁷ Section 3.3.1 and Figure 6 provide some more information on yields in Moldova compared with Italy.

⁸ Depreciation and interest are ignored in the following calculations. Variable costs thus only consist of actual cash expenses.

Table 2: Crop area and yields by regions

	Causeni			Orhei			Moldova		
	area (ha)	% of total	yield (dt/ha)	area (ha)	% of total	yield (dt/ha)	area ('000 ha)	% of total	yield (dt/ha)
Wheat	1,793	14.59	14.80	3,159	17.47	20.00	412	23.61	23.00
Maize	5,528	44.99	7.10	5,636	31.16	16.00	260	14.90	--
Sunflower	2,505	20.39	8.30	2,565	14.18	15.20	143	8.19	14.00
Tobacco	--	--	--	89	0.49	9.80	20	1.15	11.00
Sugar beets	--	--	--	636	3.52	142.00	82	4.70	235.00
Potatoes	28	0.23	11.80	188	1.04	7.10	56	3.21	58.00
Vegetables	86	0.70	31.40	190	1.05	51.90	59	3.38	58.00
Fruits	564	4.59	6.00	2,252	12.45	16.20	185	10.60	35.00
Grapes	898	7.31	23.70	3,272	18.09	34.40	186	10.66	45.00
Miscellaneous	886	7.21	--	100	0.55	--	342	19.60	--
Total	12,288	100.00		18,087	100.00		1,745	100.00	

Notes: Statements for Causeni and Orhei refer exclusively to private farm sector in farming season 1995/96. Statements for Moldova refer to collective and private farm sector in farming season 1995/96, excluding Transnistria. Area statements for Moldova refer to farming season 1994/95. Statements for total agricultural areas were estimated.

Source: Regional Departments of Statistics; Area statements for Moldova taken from WORLD BANK (1996); Yield statements for Moldova taken from MET.

cultivated, which is the median size in the survey. 1.3 ha consist of arable land, 0.3 ha are orchards and 0.4 ha vineyards. The crop ratio reflects the proportions of cultivation in the regions (Table 2). A milking cow and a bull for fattening are kept and, though exclusively for self consumption, some home gardening is practised on 0.3 ha.⁹ The farmer does not own a tractor nor any other machinery. Hence, he has to hire all machinery services he wants to make use of.

With regard to the gross margins, the following conclusions can be made:

- Gross margins of crops are generally positive, while the following sequence in terms of profitability results: grapes are most profitable, followed by apples, wheat, and maize. Permanent crops are therefore more profitable than arable crops.
- Crop yields are very low compared to Western standards (see also Table 2).
- In maize, wheat, and apple production, the bulk of costs is due to machinery services and fuel, while in grape production, seasonal labour accounts for most of the costs (see appendix).
- Gross margins of milk and beef production are also positive.
- The major costs in animal production are maize and grain feed, which can however be produced by the farms themselves. Note that the second important component of feed, i.e. grass and hay, can be taken from communal pastures.

Table 1 reveals that the crop ratio as shown does not reflect the relative advantages of the crops expressed in their gross margins. This may be due to certain technical constraints or interlinkages with animal production. For example, the current farm organisation may spread the work more evenly over the growing season. In addition, cultivation of different crops may lower the total risk. Orchards and vineyards are perennial crops, and expansion or reduction of

⁹ Home gardening is usually done on a part of the individual household plot that was already in private property prior to transition.

the cultivated area may not be that flexible to correspond always to price signals. Finally, the farmer may pursue other goals than profit maximisation, e.g. to produce an adequate diet for his household (see below).

The profit and loss account contains the gross margins of the different crops multiplied with the size of the cultivated land as well as those of animal husbandry. The operating profit results from farm gross margin minus fixed operating overheads including land tax and amounts to roughly 3,400 lei (=740 US\$) per year. This is physical yields multiplied with market prices minus total costs of farming. It is positive and for this reason the farm business can be regarded as profitable. The following sections will however show that this is only one side of reality, since a number of additional constraints have been disregarded so far. These concern the degree of subsistence, the reliability of marketing channels, and the extent to which basic living expenses can be covered.

3.1.5 Summary

It has been shown that the average private farmer produces on a minimal fraction of land, with almost no equipment suitable for mechanising field works. Furthermore, neither pesticides nor mineral fertilisers are used in a considerable extent at present. Theoretically appropriate technology for plant production is thus not used in reality. In fact, most farmers have to rely mainly on their own labour force as the only relevant input for agricultural production, and there are practically no resources available for the purchase of intermediate inputs. Though a low input use may be rational, it is in sharp contrast to what is usually understood as “commercial farming”. Private farming activities in Moldova can be profitable in figures, but farmers are clearly far away from having available a solid production base or an advanced production technology necessary for market-oriented operations.

3.2 Income situation of farm households

The aim of this chapter is to shed more light on two issues that qualify the profitability statement of the previous paragraph. This is achieved by widening the analytical framework used so far, namely by explicitly including the farmer’s household into the examination. Consequently, the first issue to be dealt with is the extent of subsistence production. The second issue is to regard all income sources of the household and to compare these with the basic living expenses in order to assess the extent of poverty.

3.2.1 Subsistence and cash flow

The degree of subsistence is expressed by the share of agricultural products that is neither used as intermediate factors on the farm, nor sold to the market, but is consumed by the household itself.¹⁰ The ‘Use of agricultural output’-statement in Table 3 shows the real use of the produced agricultural goods of the typical farm, which is now converted into a ‘typical household’ of a peasant farm.

19%, that are 1,362.50 lei, of the agricultural output are used by other farm activities, especially livestock, according to the gross margin statements (see appendix). 55%, that are 3,946 lei, of the farm products are consumed by the household itself and represent the extent of subsistence. The goods consumed by the typical household are the bulk of the livestock products (i.e. milk and meat) as well as a considerable share of cereals. The residual 26% or 1,846.50

¹⁰ Storage of goods for more than one year is thus ignored.

Table 3: Financial statements of a typical household of a peasant farm

Use of agricultural output			
Total agricultural output	7,173.00 lei		
On farm intermediate input	-1,362.50 lei		
Home consumption ^a	-3,946.00 lei		
Actual market output	1,864.50 lei		

Balance of sources and uses of household funds			
Sources		Uses	
Sales of agricultural products	1,864.50 lei	Net farm costs ^b	3,235.80 lei
Additional labour income	2,400.00 lei	Living expenses	12,676.00 lei
Value taken from ag. output ^a	4,090.00 lei		
Home gardening output	2,149.64 lei		
<i>Total sources of funds</i>	10,504.14 lei	<i>Total uses of funds</i>	15,911.80 lei
Deficit	5,407.66 lei		

Notes: ^a *Value taken from ag. output* corresponds to *Home consumption*. The first is valued with slightly different prices than the latter, which leads to different deficits (see appendix);

^b Net of intermediate products as stated in the detailed gross margins (see appendix) and including home gardening costs.

Source: Own calculations based on case study results. For detailed calculations and sources see appendix.

lei are potentially sold at the various market outlets including barter trade; this is mainly grapes, apples, and the milk not consumed by the household (see also Section 3.3.2 below).

In the following, the cash surplus or deficit of the farming business is quantified under consideration of household self consumption as the difference between actual product sales and total cash expenses. The sum of all cash expenses net of intermediate products plus operating overheads amounts to 2435.80 lei. This exceeds the value of market sales (1846.50 lei) by 571.30 lei (=124 US\$), which is the annual cash deficit. The farm profit as calculated in Section 3.1.4 is thus turned into a loss if only actual market sales are taken as a reference.

Under these conditions, how do the farmers cover their cash expenses? To shed light on this, it is necessary to take into account two further sources of potential cash income, namely off-farm employment of household members and pensions.

In the survey, 30% of all farmers reported that they have a part time off-farm occupation. Since more detailed information on the structure of off-farm employment is not available, the quality of the non-farm labour market cannot be comprehensively assessed. For the typical household one additional labour income of 2,400 lei (=520 US\$) per year is assumed. This is the monthly average wage (UNDP 1996; MET). Pensions currently do not significantly contribute to household income, since they are paid very irregularly and, at the time of the survey, were in arrears for months. Hence, total cash income of the household sums up to 1,828.70 lei (=397 US\$) per year, and out-of-pocket cash expenses for the farming business are covered by the off-farm labour income.

Due to the importance of subsistence production, we return to an analysis of all product flows including physical ones in the following. However, they are expressed in monetary terms to make them comparable.

3.2.2 Household income and poverty assessment

This section aims at compiling all sources of funds of the typical household and to compare them with a measure of basic living expenses. Thus, the attempt is made to investigate the incidence of poverty in the traditional, straightforward way of establishing an absolute poverty line (DEATON 1997, Chapter 3.1; RAY 1998, Section 8). This poverty line was set in accordance with the physical standards of the minimum consumer basket valid in 1997 as issued by the government of Moldova. Standards for basic food items are published in the National Human Development Report 1996 of the UN Development Programme (UNDP 1996, p.32). The physical food items were used with slight modifications and were valued with average current prices recorded during the survey. Non-food goods and services were taken from the same source, and were added as a flat rate. Compared to the governmental statements the non-food share was reduced, which expresses the assumed lower importance of non-food and service items in the rural areas. As a major item, private farm households usually don't have to pay for housing.¹¹ The calculations led to an *Engel*-coefficient of 0.53 which ascertains the share of food-expenditures in relation to the total household budget.¹²

The detailed calculations are given in the appendix and result in a yearly expenditure of 3,169 lei (=690 US\$) per adult person, that is 12,676 lei (=2,760 US\$) per family with four adult members. In case the actual average income of the farm household is below this line, the household is regarded as being poor.

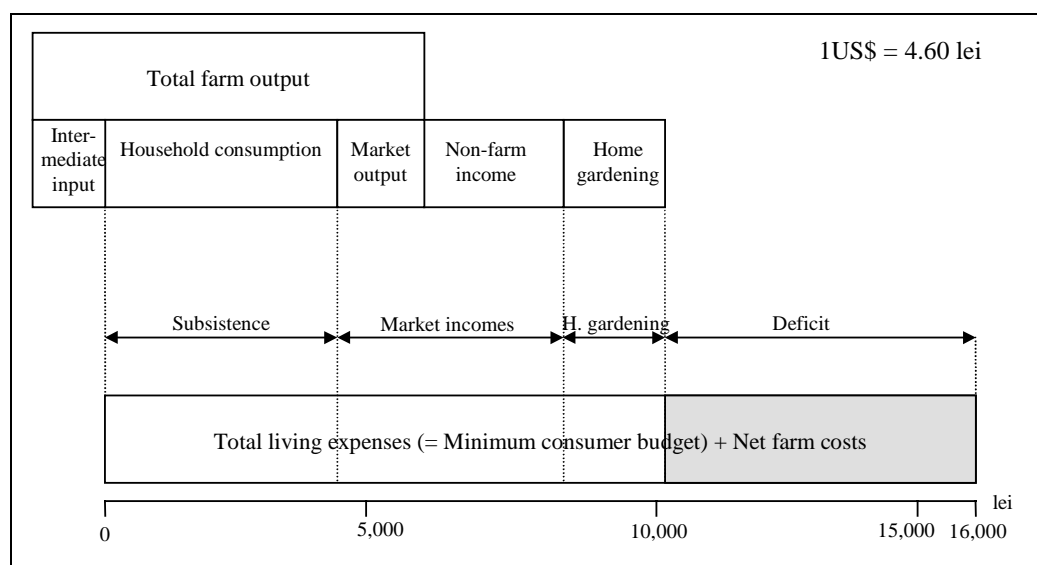
The income sources of the household mentioned so far are complemented by the output of home gardening, which amounts to 2149.64 lei (see appendix). On the left hand of the 'Balance of sources and uses of household funds' (Table 3) all sources of household income are compiled in monetary terms. They add to roughly 10,500 lei, which is the sum of market sales of agricultural products, off-farm labour income, home gardening, and the value taken from farm output.

Subtracting net farm costs in a first step, 7268.34 lei remain as annual family income, equaling on average about 150 lei (=33 US\$) per month and adult family member. This is in fact less than the off-farm labour income of 200 lei per month.

Comparing this with the minimum consumer budget reveals an annual shortfall of income of roughly 5,400 lei (=1,170 US\$, Table 3). Hence, the Moldovan average farm household that is in accordance with these calculations is in fact poor. The quantified household poverty gap of this calculation, that is the income shortfall as a percentage of total living expenses, amounts to 43%. The assessment becomes even worse taking into account the delayed and uncertain payment of wages and sold products.

¹¹ As a reference, UNDP (1996) reports 60 to 80 US\$ per month for a one- or two-room apartment in the capital Chisinau (p. 33).

¹² An interesting comparison can be made with *Engel*-coefficients for Poland and the Czech Republic as published by BROSIG (2000). According to his calculations, Polish worker families spent 38.2% of their total living expenses on food items, Polish pensioners 42.5%, Czech worker families 28.7%, and Czech pensioners 38.9% (pp. 142-151, statements for 1996).

Figure 5: Income situation of a typical household

Source: Own depiction.

For a graphical depiction of the different financial contributions see Figure 5: Roughly 39% of the total uses of funds are taken (in a physical form) from self produced goods (26% from farm output and 13% from home gardening). 12% contribute the sales of farm products and 15% the non-farm labour income. 34% of the uses are not covered by the sources, which is the deficit.

In recent years, poverty assessments conducted by UNDP repeatedly confirmed this result in its tendency. Both the National Human Development Reports for 1998 and for 1999 ascertain a critical income situation for rural residents. In both publications, farmers are explicitly categorised as those social groups within the Moldovan society that are threatened most by poverty (UNDP 1998, pp. 48-49; 1999, pp.42-43).

Nevertheless, some qualifying remarks on the presented figures are in order. Firstly, how do households survive in the presence of this income gap that does not even allow any capital accumulation or savings? This is a challenging question that is subject to further research. It can be hypothesised that especially consumption of non-food items is reduced. For example, recent statistics show that the equipping with household appliances is considerably lower in rural areas of Moldova than in urban (UNDP 1998). Furthermore, long-term saving and dis-saving behaviour have generally been neglected in the above calculations. The value of the residential building, for example, is only reflected in the reduced expenditure side of the poverty assessment, although it could be argued that this is a benefit in money's worth.

A crucial assumption concerns the availability of off-farm employment opportunities. As the calculations suggest, the extent of poverty essentially hinges on the amount of cash that can be generated on the labour market. The decision to use the average salary may still overestimate the actual income opportunities of rural households and therefore may be too optimistic.

Finally, the question has to be raised whether the applied minimum consumer basket does appropriately reflect human needs in the country. To establish a poverty line is always susceptible to a lot of criticism. For this reason, regularly revisions of the national poverty line are regarded as indispensable in the future. In fact, UNDP critically comments on the figures reported by the government in most editions of the National Human Development Report (e.g. 1996, 1998 and 1999).

3.2.3 Summary

Since a significant amount of products is consumed by the households themselves, market sales are not sufficient to cover the costs of production in the example calculations. The general purpose of production seems to be more towards a comprehensive self sufficiency rather than towards distinct commercial activities. The household budget further reveals that the typical farm household faces a serious income shortfall as compared to the national minimum consumer budget. Moldovan private farmers thus cannot meet basic living expenses. The income shortfall as a percentage of minimum needs amounts to an alarming 43%.

3.3 Risk exposure

An important component of personal welfare is, apart from the level of income, the certainty or reliability of income streams over time. Since risk aversion is usually negatively correlated with wealth, poor farmers can be assumed to markedly dislike variations of their annual income level. Risk exposure must therefore not be ignored in an assessment of private agriculture. Two aspects seem to be of particular importance, which are discussed in the following: yield risk and marketing risk.

3.3.1 Yield risk

Crop production in Moldova is hampered by the generally high production risk, due to local climatic conditions and the fragmentation of farm land. Rainfall variation – from an average 550 mm annually in the north to 375 mm in the south – and lengthy breaks of rainfall together with hot winds (*sukhovei*) can lead to severe droughts that seriously endanger the harvest, as will be the case this year (INTERLIC 2000). The event of droughts is highly unpredictable and thus imposes a significant risk on crop production. Since costs of investment in irrigation equipment are prohibitive at present, private farmers' means to cope with drought are very limited. In addition, timely field operations are complicated by the highly fragmented farm structure in combination with poor infrastructure (see Section 3.1.1).

Any assessment of agricultural production and thus also of economic success of private farming must not ignore eventually significant yearly variations. However, reliable information on the factual variation of profit and income is hardly available. It is neither provided by LERMAN et al., nor can it be derived from the data-set the current paper draws on. To get at least an idea of the degree and significance of production variability, Figure 6 compiles the annual yields of cereals, potatoes and grapes for the period of 1980-1998. Since these numbers are national averages, the farm-level variation is of course substantially underestimated due to data aggregation. In addition, the figures only can tell something about the agricultural sector as a whole, not about private farming alone. For the sake of comparison, the same numbers for Italy as a western country are also depicted in the figure. Italy is approximately located on the same latitude as Moldova, and the crops under cultivation are similar. The respective values of the mean and the coefficient of variation (CV) as a standardised measure of variability have been added as well.¹³ For Moldova, not only the values for the whole period, but also for the time spans 1980-1989 and 1990-1998 have been calculated. The figure thus allows comparisons both of yields between countries and of yields prior and posterior to national independence and the beginning of farm restructuring.

¹³ The CV still includes the systematic trend, it therefore overestimates the random variation where the trend is pronounced.

The following conclusions can be drawn from Figure 6:

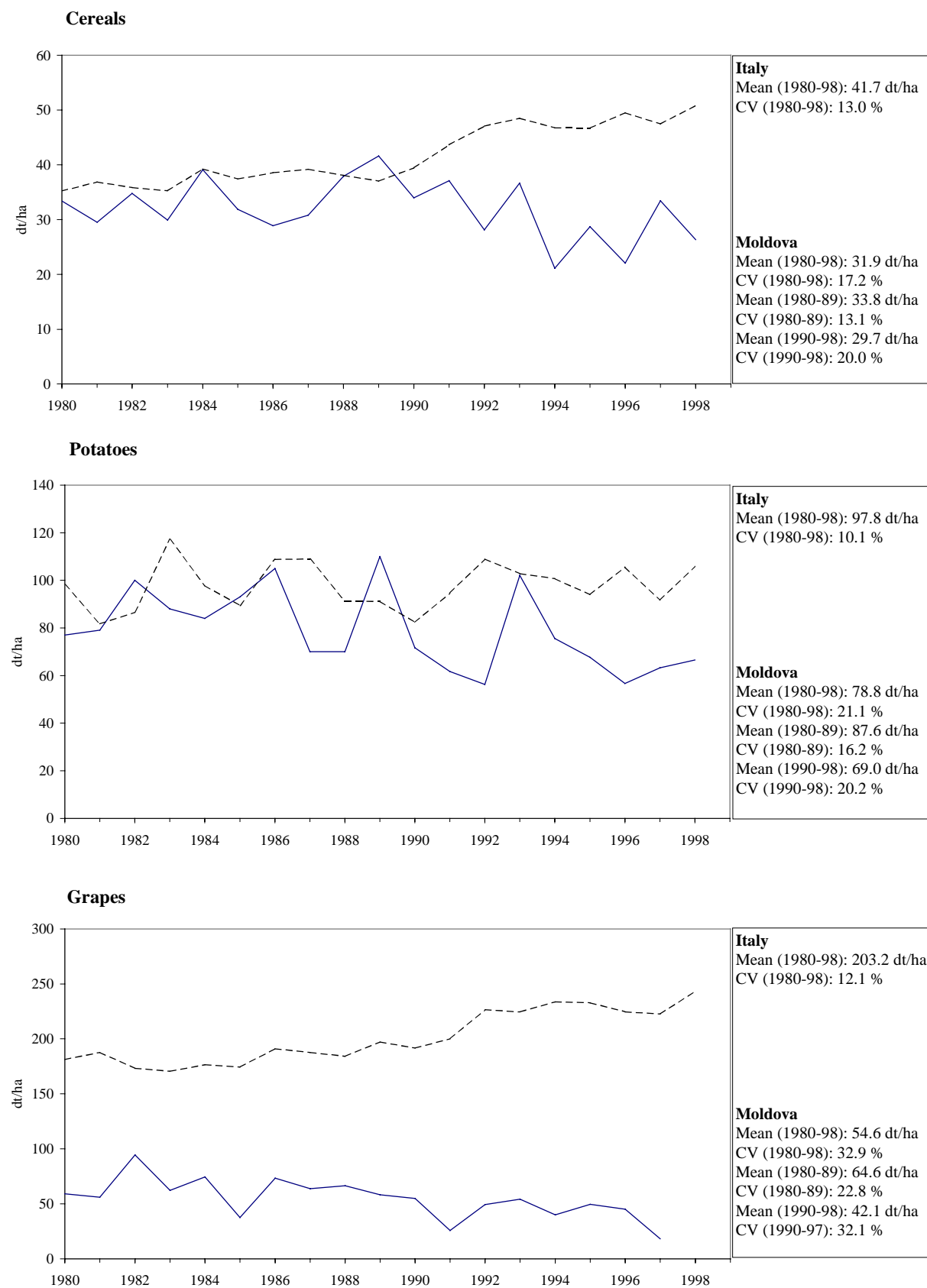
- Crop yields in Moldova are considerably lower than in Italy.
- Crop yields in Moldova are lower after transition than before.
- The yield variability for the period 1980-1998 expressed by the CV for every crop considerably exceeds that of the same crop in Italy.
- Variability in Moldova is higher for the period 1990-1998 compared with 1980-1989.

Therefore, yield variability prior to transition in Moldova is generally lower than posterior, while yield levels are higher.

To some extent, the lower level of yields and the higher variation in Moldova compared with Italy may be attributed to less favourable natural conditions for plant production as outlined above. Since these conditions can be assumed to remain constant during the whole time period, it is however fair to say that the transition process obviously had a negative impact on yield levels in Moldova and, additionally, led to an increased yield risk. Under the assumption that production technology even in the years after 1990 did not differ much between private and large-scale agriculture,¹⁴ this is perfectly in line with the survey results presented in Chapter 3.1 which point to a suboptimal technology utilisation in Moldovan agriculture at present.

As a result, the transition process increased the risk exposure of agriculture, which is high compared with both the pre-transition period and western standards. Since crop production contributes a substantial amount to farm income (see Chapter 3.2), yield variability is likely to exert a strong impact on income variance.

¹⁴ So far, this is an untested hypothesis. However, LERMAN et al. (1998) could not find any systematic difference in land productivity between large-scale and private farms (p. 76-77). My impression is also that private farmers usually simply copy the production techniques used in former collective farms as far as liquidity and availability of machinery allow.

Figure 6: Yields of selected crops 1980-1998 in Moldova and Italy

Notes: Moldova 1997 and 1998 excluding Transnistria; CV = Coefficient of Variation.

Source: Own calculations based on SHEND (1993), MET and FAO.

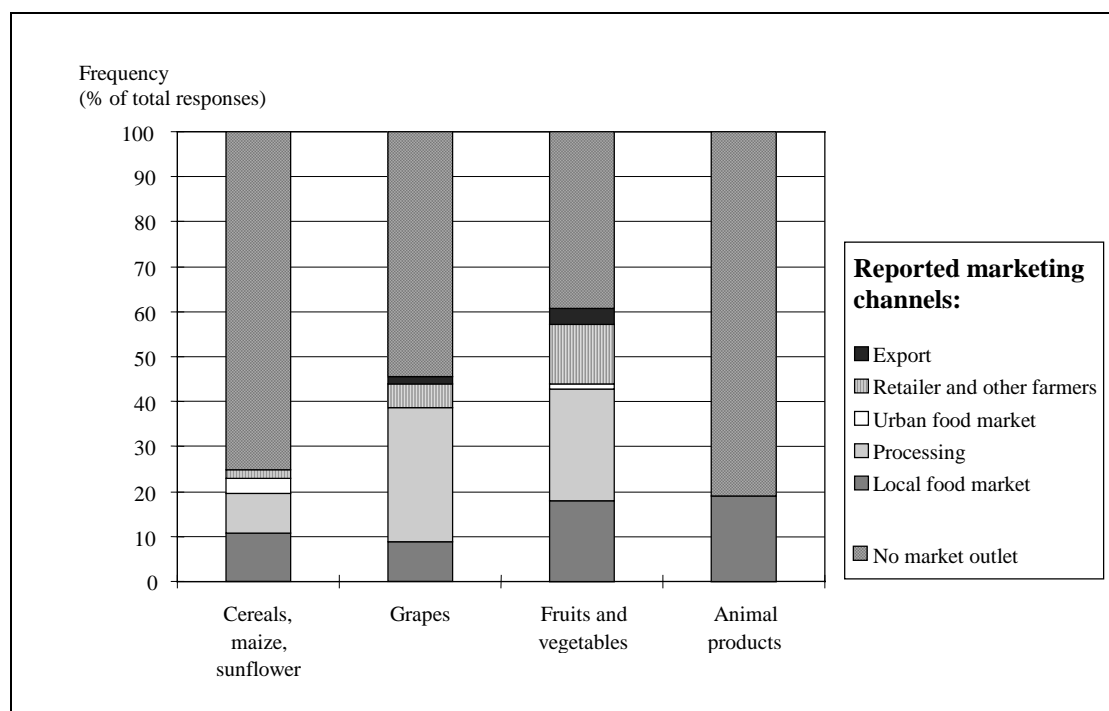
3.3.2 Marketing risk

Private farmers encounter great difficulties in selling their products. Downstream markets in Moldova bear a high risk and are mostly inaccessible for private farmers. The marketing risk consists of several parts:

- the risk of not finding any buyer at all,
- the risk of substantially delayed payments or only payments in kind,
- the general price risk due to seasonality and inflation.

Figure 7 shows that farmers have no market outlet for the majority of their products. Marketing difficulties are mainly due to the continued existence of former state trade and processing monopsonists such as ‘Cereale’, who are often not willing to buy products from private farms, and the absence of alternative marketing channels. Especially cereals, maize and sunflower, which predominate in crop production, are mainly not sold at a market outlet. This is also true for grapes, fruits and vegetables, although their shares in the market supply are larger. Only 19% of the farmers who keep animals sell their products, which underlines the importance of livestock farming for subsistence.

Figure 7: Marketing channels for private farm products



Source: Own calculations from survey.

To some extent, both grapes, and fruits and vegetables are sold to the processing industry. In general, products can be sold for cash at the local food market, though demand is limited. The local market is normally found in the town where the regional administration is based. ‘Retailer and other farmers’ are mainly partners for barter trade. However, it is very difficult to assess the real extent of non-cash trade. About half of the respondents in the sample use it in a considerable share of their business, i.e. in more than 30% of all transactions. The most common products used for barter trade are wheat, maize and wine.

An insignificant amount of grapes and fruits and vegetables is exported at present. Whereas in future the markets for Moldovan agricultural goods will be mainly outside the country, this low level underlines the current underdevelopment of viable export marketing channels.

Presumably the majority of products marked as 'without market outlet' is used by the farm households themselves for either human or animal consumption. The rest is used for casual barter trade or payment. A large part of the grape harvest is processed by the farmers themselves for the individual household's consumption of wine. Fruits and vegetables are preserved for consumption during winter. This points to the considerable importance of subsistence farming in private agriculture (see Section 3.2.1).

An important problem of the rural economy is the delay of payment by former state processing companies. Sometimes this means delays of one year and more, and farmers are paid only in kind, that is with processed goods. This greatly affects the liquidity of private farm businesses and increases uncertainty of incomes. None of the respondents in the sample own considerable storage facilities such as a barn or a shed for machinery besides the typical residential house. This is due to the fact that most of the privatised state farm buildings are owned jointly and new buildings have not been erected yet. Farmers thus have only very limited means to react to fluctuations in product supply, with the consequence of significant seasonal price variation.

3.3.3 Summary

The previous paragraphs illustrate the various sources of risk that affect farmers' incomes. These risks are due to natural conditions and a suboptimal use of technology, both resulting in yield uncertainty, and due to market frictions resulting from the transition process. Private farmers as a new sort of producers often do not have access to any of the distribution channels that were designed for collective agriculture, or these distribution channels do not exist anymore, and new marketing facilities have yet to be developed. Even if farmers are able to realise profits, which is further complicated by the barterisation of the rural economy, these profits are highly uncertain and likely to be unstable over time. This is a strong qualification of any positive income assessment.

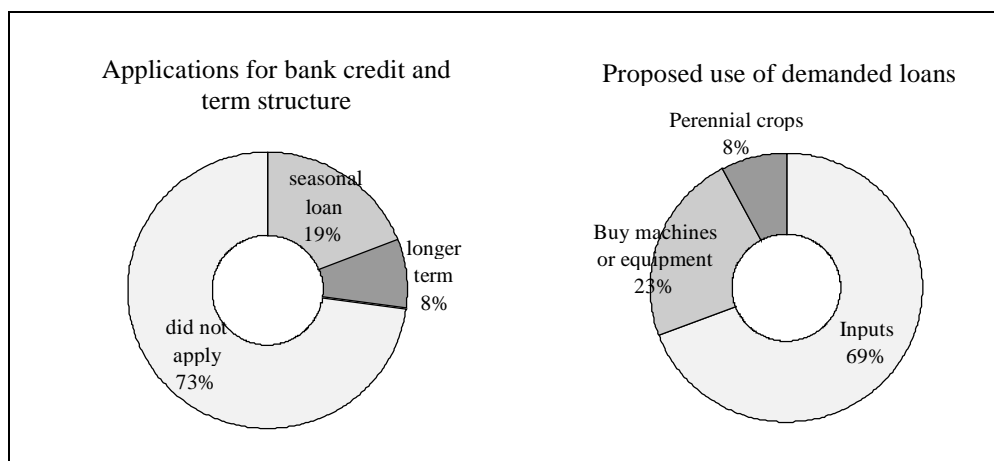
3.4 Access to the rural credit market¹⁵

Any substantial restructuring requires, at least temporarily, the inflow of additional capital. Access to credit markets is therefore of pivotal importance for improving production structures and business development in private farming. This section gives an examination of current problems of credit funding in Moldovan agriculture.

3.4.1 Farmers' assessment of their creditworthiness

25% of all farmers surveyed had applied to a bank for credit during the previous three farming seasons, of which two thirds had asked for a seasonal loan. More than half of all demanded loans were smaller than 5,000 lei (=1,100 US\$). Since farmers reported on a period of three farming seasons, the interest rates charged by banks varied widely. The highest interest rate mentioned was 200% p.a.. 69% of credit proposals concerned the purchase of inputs, 23% the investment in machinery or equipment, 8% were used for improving existing orchards or vineyards (clearing, hoeing) or planting new fruit trees or vines (Figure 8). Consumption credit was hardly ever demanded, even by poor households. This result may be partly due to the great difficulties in investigating intra-household and intra-family flows of funds. Another

¹⁵ This is investigated in more depth in PETRICK (1999).

Figure 8: Farmers' experiences with bank credit services so far

Note: Total number of applications is the reference value.

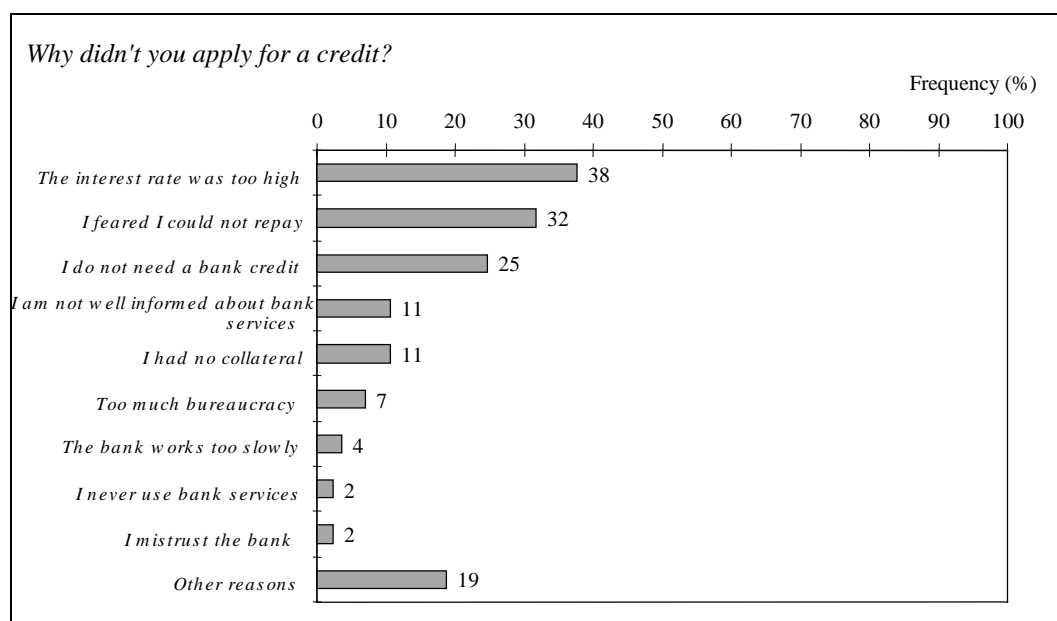
Source: Own calculations from survey.

possible interpretation is that, since no supply of consumption credit is available, people do not consciously consider this possibility.

59% of all farmers surveyed who asked for a bank loan did actually receive it. This means that nearly 16% of all respondents in the sample had applied successfully for a formal credit during the previous farming seasons.

11 farmers in the survey applied for credit but were rejected. Of these, 27% had no adequate collateral, and 19% were rejected because their business plans had not been approved. In 27% of the cases, the bank approved the business plan but had itself liquidity problems; therefore, the credit was not actually paid out. 27% had other reasons for rejection.

The reasons why farmers did not apply for credit (Figure 9) suggest that they assess their creditworthiness very sceptically. Most frequently, the perception of too high interest rates and the fear of not being able to repay were recorded. These two highest ranking items imply that credit may be available at a price. They also reveal private farmers' awareness that the investment projects they have in mind under the current economic conditions and the given interest rate will not generate sufficient cash flows to service a loan (this reasoning draws on PEDERSON and KHITARISHVILI 1997). As a result one could argue that the prevailing interest rates accurately reflect the premium for the underlying rates of expected risks, especially in Moldova where the government does not intervene in credit markets. However, expected cash flows in agriculture may not be sufficient to attract these scarce external funds.

Figure 9: Reasons for not applying to a bank for credit

Note: Multiple answers can total over 100%.

Source: Own calculations from survey.

3.4.2 Conditions for credit funding in agriculture

The case study suggests that in the short to medium run all types of investment which aim to improve productivity in agriculture and thus increase the value added by more favourable input-output ratios will fail to generate an adequate monetary pay-off. This is mainly due to the high risks attached to agricultural production as outlined in Chapter 3.3, and is seen as a significant obstacle to a more serious engagement of banks in agriculture, both with regard to short- and long-term credits.

As Chapter 3.2 sets out, the meagre income position and the prevalence of poverty kept farmers from accumulating any substantial equity in the years since national independence. Thus, they will not be able to contribute any significant funds of their own to their investment projects. Most investment projects will lack a sufficient liquidity base, which in turn will make potential lenders reluctant to give credit. Furthermore, additional liquidity will most likely be subject to senior claims for consumption purposes, which may reduce the likelihood of repayment. As the calculations for the typical farm household in Section 3.2.1 have shown, cash flow from agricultural production does not even suffice to cover all expenses for inputs.

Apart from these problems, a lack of management skills among private farmers is likely to deter creditors' interest in private farming. In the context of investment decisions, management capacity is needed

- to identify viable and remunerative investment projects,
- to apply successfully for external funding,
- to implement and carry out investment, and
- to monitor performance and cash flow.

Most farmers completely lack this managerial knowledge and experience. Many of the private farmers surveyed are former kolkhoz workers without any special training in agriculture or

management. In general, people are not used to being responsible for the economic success of a farm. Only some of them previously worked as 'agronomists' on the former state farms. Most of the Moldovan farmers are still used to someone else (the kolkhoz or the state) being responsible for their livelihoods, and have difficulties in adapting to the new conditions. Despite the fact that it is presumably those farmers that left the collectives who had particular confidence in their ability to run a farm business on their own, only a minority will be able to set up a feasible and credible business plan as a precondition to obtain a loan.

3.4.3 Inherent imperfections of the rural credit market

Imperfections inherent to rural credit markets potentially hamper the flow of credit to agriculture for the following reasons:

- Farmers have difficulties in securing a loan, i.e. they are not able to provide sufficient collateral.
- The bank rations credit as a response to prevailing information asymmetries.
- Farmers face significant transaction costs when negotiating a loan contract; these costs may be prohibitively high.

For 11% of the farmers, lack of collateral was a reason for not applying to a bank for credit; they thus anticipated this requirement for obtaining a loan (Figure 9). For 27% of the farmers who did apply for credit, this was indeed the obstacle to obtaining the loan (see Section 3.4.1). Land may serve as collateral if legal obstacles hindering this can be overcome. However, farmers may be reluctant to jeopardise the basis of their livelihoods. The same applies to the use of dwellings as collateral. Since most farm households possess almost no other suitable assets, the collateral problem will probably persist in the medium run.

Information asymmetries obviously exist and are likely to restrict the flow of credit to private farmers. The survey shows that only few farmers have a bank account, and even fewer make use of it. This suggests that economic relations between the bank and the client are not very close in general. This in turn affects the lending practice of the bank and increases the costs of loan appraisals. Banks currently try to assess farmers' eligibility in several field visits. Extensive business plans and ownership certificates of buildings or machinery have to be presented by the farmers. Therefore it is unlikely that the interest rate is used as an indirect screening mechanism, as happens on informal credit markets (HOFF and STIGLITZ 1993). Instead the bank prefers to adapt the collateral requirements to the expected risk of an investment. Thus, credit rationing in a strict sense does not occur.

Clearly, the poor state of the transport and communications infrastructures, in combination with spatial dispersion and the small scale of rural settlements, increase transaction costs for small private farmers. Furthermore, a significant share of farmers considered the banks' inadequacies, particularly the high level of bureaucracy and the slowness of banking services, as an obstacle to applying for credit (Figure 9). This is partly due to the extensive loan appraisal procedures employed by the banks, which also require the farmer to conclude insurance contracts for certain collateral items. Another share of respondents complained about insufficient information on banking services. All this shows the importance of transaction costs, since the costs of information gathering, contract negotiation, waiting etc. add to the interest rate.

Since 1997 a number of Savings and Credit Associations (SCA's) have been created with support of the World Bank in order to overcome the obstacles mentioned before. These groups could potentially utilise the advantages of co-operative lending institutions known from other countries. However, the SCA's did not emerge as real self-help groups but were founded in a

top-down approach. Their only purpose to exist is to obtain credit that is externally financed without any savings contribution of the participants. This eventually jeopardises sustainability of the SCA's in the long run. Since they have been founded just recently, little can be said about their repayment performance. Whether education and training of members achieved a substantial improvement of management skills remains also to be seen.

3.4.4 Summary

With regard to the future development of private agriculture, it must be concluded that the conditions for investment in farming activities give little reason for optimism. Economic risks as described earlier, a lack of equity and sufficient managerial experience on the farmers' side, and market imperfections correspond with the critical assessment of creditworthiness that farmers themselves expressed during the survey. According to these circumstances, prosperity may have difficulties to settle down in rural Moldova in the near future.

4 CONCLUSIONS AND OUTLOOK

Land reform in Moldova has led to the emergence of peasant farms. This can be labelled a formal reform success, though the economic situation of these new economic entities is critical. The discussion has shown that private farmers in Moldova are confronted with huge economic difficulties that severely affect their standards of living and seriously restrict their entrepreneurial opportunities. The range of objective inadequacies spans from little farm sizes over a paucity of machinery and inputs to deficient downstream markets, persistent income risks, and lack of access to credit. All this results in widespread poverty among the rural population, a distinct subsistence orientation of production, and, at least at present, little hope for a quick recovery of the rural economy. Private farmers therefore can hardly be generally described as winners of transition, as LERMAN et al. (1998) do. In fact, the analysis suggests an assessment of the reform processes that comes close to what is expressed by "falling out of the frying-pan into the fire".

The pure facts presented in this paper do not differ much from those compiled by LERMAN et al. It seems to be more the point of view and the respective interpretation of the data that lead to such different conclusions. LERMAN et al. compare the situation of private farmers with that of employees on large farms, which have not been the subject of the present paper. There may be good arguments supporting the view that employees are worse off than independent farmers. People therefore prefer to leave the former collectives if they have the chance to do so. There also may be single private farmers who managed to significantly improve their standards of living during the process of land reform and privatisation, although, due to an inherent selection bias, it may be methodologically difficult to clearly identify individualisation as the decisive determinant of personal well-being. Generally, there are probably no alternatives to a substantial restructuring of collective farms and a consequent privatisation of farmland and assets. However, in my opinion, an assessment of the average situation in the countryside cannot close the eyes to the aforementioned deficiencies that reflect a highly adverse environment particularly for private farmers.

Small farm sizes in Moldova seem to be less a problem of efficiency than one of equitable access to income sources. The current paper shows that farm families cannot generate a sufficient income to secure their livelihood from farming alone. Since the Moldovan state cannot afford any governmental support at the moment, farmers are dependent on the availability of off-farm employment opportunities. According to the analysis of a typical household of a peasant farm presented in this paper, off-farm income is even necessary to cover the cash ex-

penses associated with farming operations. How easily accessible these non-farm income sources are could not be conclusively verified with the existing information, it is therefore subject to further research. However, the non-farm sector is likely to play a decisive role in the future development of the rural economy. Similar importance has the emergence of functioning land and credit markets. These would allow the consolidation of land holdings and/or the intensification of production and in this way foster structural change in agriculture hand in hand with the growth of the non-farm sector.

To remedy the situation of agriculture in Moldova is a task that, due to the importance of the sector for the economy as a whole, deserves high priority but requires a lot of staying power and probably provides little opportunity to receive plaudits for. A strategy to improve the economic perspectives in rural Moldova clearly needs a broad based approach that aims at creating a more favourable economic environment for private farming – this is where I fully agree with LERMAN et al. Among the numerous difficulties described in this paper, it seems to me that the availability of reliable marketing channels for agricultural products is of pivotal importance for the future development of farming in the country. In the past, Moldova has been a major exporter of products such as fruits, vegetables, or wine. Re-establishing former trade relations may therefore be an important step to open up new sources of income for farmers and to breathe new life into market-oriented crop production. This would decrease marketing risks and stabilise incomes, and thus pave the way for credit funded investment in advanced technologies and modern equipment. Especially other CIS countries may again become importers of Moldovan products, as a representative of the city of St. Petersburg put it (INFOTAG 1999):

“Presently, our market is overstocked with products from the Netherlands, Israel, Poland, etc., but many citizens of St. Petersburg, Murmansk, Novgorod and dozens of other cities remember very well the high-quality, ecologically clean fruit, vegetables, canned food from Moldova. They are ready to buy these products in unlimited quantities. St. Petersburg Governor Vladimir Yakovlev has decreed to allot one of the big municipal markets specially for trading Moldovan food products, but it is practically idling so far.”

The last sentence however suggests that there are still a lot of steps necessary until Moldovan farmers enjoy new development perspectives and economic prosperity. These steps include bilateral agreements on trade liberalisation, additional efforts of public investment in infrastructure and education, and, not least, political stability and a government capable of acting and enforcing legal requirements.

Future research should aim at identifying promising markets for Moldovan products. A central question in this respect will be how products come from the farm-gate to the consumer. Studying marketing channels and intermediate traders might therefore contribute a lot to understand recent difficulties in marketing Moldovan food. A related problem is that of the apparent lack of new forms of cooperation in marketing, finance or mechanisation. Another question posed by this paper is how private farmers survive in the presence of poverty. A study of the determinants and the short- and long-term effects of insufficient income with specific consideration of subsistence production will also provide valuable implications for government policy.

REFERENCES

- ALLEN, D.W., LUECK, D. (1998): The nature of the farm, *Journal of Law and Economics*, Vol. 41, pp. 343-386.
- BINSWANGER, H.P., DEININGER, K., FEDER, G. (1995): Power, Distortions, Revolt and Reform in Agricultural Land Relations, in: BEHRMAN, J., SRINIVASAN, T.N. (eds.): *Handbook of Development Economics*, Vol. III, Amsterdam, Elsevier, pp. 2659-2772.
- BROSIG, S. (2000): Die private Nachfrage nach Nahrungsmitteln im Transformationsprozess Tschechiens und Polens, *Studies on the Agricultural and Food Sector in Central and Eastern Europe* Vol. 4, Kiel, Wissenschaftsverlag Vauk.
- CASLEY, D.J., LURY, D.A. (1981): *Data Collection in Developing Countries*, Oxford, Clarendon Press.
- CSAKI, C., LERMAN, Z. (1996): Agricultural Transition Revisited: Issues of Land Reform and Farm Restructuring in East Central Europe and the Former USSR, *Quarterly Journal of International Agriculture*, Vol. 35, pp. 211-240.
- CSAKI, C., LERMAN, Z. (1997): Land reform and farm restructuring in East Central Europe and CIS in the 1990s: Expectations and achievements after the first five years, *European Review of Agricultural Economics*, Vol. 24, pp. 428-452.
- DEATON, A. (1997): *The Analysis of Household Surveys, A Microeconomic Approach to Development Policy*, Baltimore, Johns Hopkins University Press (for The World Bank).
- DUMITRASHKO, M. (2000): Land Reform in the Republic of Moldova and Land Market Development [in Russian], in: TILLACK, P., SCHULZE, E. (eds.): *Land Ownership, Land Markets and Their Influence on the Efficiency of Agricultural Production in Central and Eastern Europe*, *Studies on the Agricultural and Food Sector in Central and Eastern Europe* Vol. 9, Kiel, Wissenschaftsverlag Vauk, pp. 461-474.
- DUMITRASHKO, M., KAINARJAN, N. (1997): Der Prozess der Privatisierung und die Rechtsformen der Betriebe des AIK der Republik Moldawien, in: TILLACK, P., SCHULZE, E. (eds.): *Privatisierungsprozeß, Rechtsformen und Betriebsstrukturen im Agrarbereich der mittel- und osteuropäischen Länder*, Beiträge zum Seminar am 26./27.11.1996 in Halle/Saale, Halle (Saale), IAMO, pp.149-153.
- FAO: FAO statistical database at <http://www.fao.org>.
- HOFF, K., STIGLITZ, J.E. (1993): Imperfect Information and Rural Credit Markets: Puzzles and Policy Perspectives, in: HOFF, K., BRAVERMAN, A., STIGLITZ, J.E. (eds.): *The Economics of Rural Organisation, Theory, Practice, and Policy*, Oxford, Oxford University Press, pp. 33-52.
- INFOTAG (1999): Russia's North-western Region Interested to Obtain Fruit and Vegetables from Moldova, Infotag press report 07.09.1999.
- INTERLIC (2000): Moldova: The Most Droughty Country in Europe, Interlic press report 13.07.2000.
- LAVIGNE, M. (1999): *The Economics of Transition, From Socialist Economy to Market Economy*, second edition, London, Macmillan Press.
- LERMAN, Z. (1998): Does land reform matter? Some experiences from the former Soviet Union, *European Review of Agricultural Economics*, Vol. 25, pp. 307-330.
- LERMAN, Z. (1999): Land Reform and Farm Restructuring: What Has Been Accomplished to Date? *American Economic Review Papers and Proceedings*, Vol. 89, pp. 271-275.
- LERMAN, Z. (2000): From Commonality to Divergence: How ECE and CIS Agricultures are Drifting Apart, in: TILLACK, P., SCHULZE, E. (eds.): *Land Ownership, Land Markets and Their Influence on the Efficiency of Agricultural Production in Central and Eastern Europe*, *Studies on the Agri-*

- cultural and Food Sector in Central and Eastern Europe Vol. 9*, Kiel, Wissenschaftsverlag Vauk, pp. 56-69.
- LERMAN, Z., CSAKI, C., MOROZ, V. (1998): Land Reform and Farm Restructuring in Moldova, Progress and Prospects, *World Bank Discussion Paper No. 398*, Washington D.C., World Bank.
- MACOURS, K., SWINNEN, J.F.M. (2000): Causes of Output Decline in Economic Transition: The Case of Central and Eastern European Agriculture, *Journal of Comparative Economics*, Vol. 28, pp. 172-206.
- MANEN, B. v., BIEMANS, W. (1996): Tacis-Pilot Project in Privatisation Orhei-Moldova, Development of a Rural Credit Scheme, Identification Mission, Hamburg, GFA.
- MET: Moldovan Economic Trends, Chisinau, various quarterly issues. See also <http://www.un.md/Tacis/met.htm>.
- PEDERSON, G., KHITARISHVILI, T. (1997): Challenges of Agricultural and Rural Finance in CEE, NIS and Baltic Countries, *Working Paper WP97-5*, Center for International Food and Agricultural Policy, St. Paul, University of Minnesota.
- PETRICK, M. (1998): The Demand for Financial Services by Small Farm Households in Moldova, unpublished Diploma thesis, Institute of Rural Development, Göttingen, University of Göttingen.
- PETRICK, M. (1999): Demand or supply constraints? Financial intermediation in the private farm sector of Moldova, *Quarterly Journal of International Agriculture*, Vol. 38, pp. 150-164.
- RAY, D. (1998): Development Economics, Princeton, Princeton University Press.
- SARRIS, A., DOUCHA, T., MATHIJS, E. (1999): Agricultural restructuring in central and eastern Europe: implications for competitiveness and rural development, *European Review of Agricultural Economics*, Vol. 26, pp. 305-329.
- SCHMITT, G. (1988): Wie optimal ist eigentlich die „optimale“ Betriebsgröße in der Landwirtschaft? *Agrarwirtschaft*, Vol. 37, pp. 234-245.
- SCHMITT, G. (1991): Why is the agriculture of advanced Western economies still organized by family farms? Will this continue to be so in the future? *European Review of Agricultural Economics*, Vol. 18, pp. 443-458.
- SCHMITT, G. (1993): Why Collectivization of Agriculture in Socialist Countries Has Failed: A Transaction Cost Approach, in: CSAKI, C., KISLEV, Y. (eds.): *Agricultural Cooperatives in Transition*, Boulder, Westview Press, pp. 143-160.
- SCHULZE, E., TILLACK, P., DOLUD, O., BUKIN, S. (1999): Eigentumsverhältnisse landwirtschaftlicher Betriebe und Unternehmen in Russland und der Ukraine – Befragungsergebnisse aus den Regionen Nowosibirsk und Shitomir, *IAMO Discussion Paper No. 18*, Halle (Saale), IAMO.
- SHEND, J.Y. (1993): Agricultural Statistics of the Former USSR Republics and the Baltic States, *Statistical Bulletin Number 863*, Washington D.C., United States Department of Agriculture.
- SWINNEN, J.F.M. (1997, ed.): Political Economy of Agrarian Reform in Central and Eastern Europe, Aldershot, Ashgate.
- SWINNEN, J.F.M. (1999): The political economy of land reform choices in Central and Eastern Europe, *Economics of Transition*, Vol. 7, pp. 637-664.
- UNDP (1996): National Human Development Report for the Republic of Moldova 1996, Chisinau, UNDP.
- UNDP (1998): National Human Development Report for the Republic of Moldova 1998, Chisinau, UNDP.
- UNDP (1999): National Human Development Report for the Republic of Moldova 1999, Chisinau, UNDP.

WORLD BANK (1996): Moldova Agriculture Policy Update, *EC4NR Agriculture Policy Note #5*, Washington D.C., World Bank.

APPENDIX: FINANCIAL STATEMENTS OF A TYPICAL PRIVATE FARM HOUSEHOLD

Farm Profit Calculation

Activities and assets of farm			
Maize	1.00 ha	Cattle	2.00 heads
Wheat	0.30 ha	of which milking cow	1.00 head
Apples	0.30 ha	Home gardening	0.30 ha
Grapes	0.40 ha	Tractors	0.00
Agricultural land total	2.00 ha	Other machinery	0.00
		Residential building	1.00

Activity	Maize				Wheat			
	quantity/ ha	unit	lei/unit	lei/ha	quantity/ ha	unit	lei/unit	lei/ha
Receipts								
Yield	20.00	dt	70.00	1,400.00	30.00	dt	50.00	1,500.00
By product	15.00	dt	0.00	0.00				
Gross income				1,400.00				1,500.00
Variable costs								
Seed	25.00	kg	4.00	100.00	200.00	kg	1.00	200.00
Mineral fertiliser								
Organic fertiliser (manure)	30.10	dt	5.00	150.50	33.00	dt	5.00	165.00
Plant protection								
Machinery services incl. fuel	1.00		500.00	500.00	1.00		450.00	450.00
Additional labour	5.00	days	10.00	50.00	5.00	days	10.00	50.00
Transport to farm/factory	1.00		50.00	50.00	1.00		50.00	50.00
Total variable costs				850.50				915.00
Gross margin				549.50				585.00
Field size	1.00	ha			0.30	ha		
Total gross margin (lei)				549.50				175.50

Activity	Apples				Grapes			
	quantity/ ha	unit	lei/unit	lei/ha	quantity/ ha	unit	lei/unit	lei/ha
Receipts								
Yield	38.00	dt	45.00	1,710.00	40.00	dt	70.00	2,800.00
Gross income				1,710.00				2,800.00
Variable costs								
Seed								
Mineral fertiliser								
Plant protection					6.00	kg	12.00	72.00
Machinery services incl. fuel	1.00		250.00	250.00	1.00		250.00	250.00
Additional labour	10.00	days	10.00	100.00	100.00	days	10.00	1,000.00
Transport to farm/factory	1.00		100.00	100.00	1.00		100.00	100.00
Total variable costs				450.00				1,422.00
Gross margin				1,260.00				1,378.00
Field size	0.30	ha			0.40	ha		
Total gross margin (lei)				378.00				551.20

Activity	Dairy			
	quantity/ head	unit	lei/unit	lei/head
Receipts				
Milk	2,250.00	kg	1.00	2,250.00
Old cow meat every 8 years	50.00	kg	3.00	150.00
Bull calf per year	0.45	head	100.00	45.00
Heifer calf per year	0.45	head	100.00	45.00
Manure	40.00	dt	5.00	200.00
Gross income				2,690.00
Variable costs				
replace one which died	0.10	head	800.00	80.00
heifer calf 1 in 8 years	0.125	head	100.00	12.50
milk for calf	50.00	kg/year	1.00	50.00
maize, grain	10.00	dt	70.00	700.00
maize, straw and cobs	10.00	dt	0.00	0.00
hay	10.00	dt	5.00	50.00
other fodder	5.00	dt	5.00	25.00
pasture services	8.00	months	7.00	56.00
veterinary costs	1.00		30.00	30.00
Total variable costs				1,003.50
Gross margin				1,686.50
Number of cows	1.00	head		
Total gross margin (lei)				1,686.50

Activity	Cattle for fattening			
	quantity/ head	unit	lei/unit	lei/head
Receipts				
Meat (1 bull in 2 years)	200.00	kg	5.00	1,000.00
Gross income				1,000.00
Variable costs				
bull calf	0.50	head	100.00	50.00
maize, grain	5.00	dt	70.00	350.00
maize, straw and cobs	5.00	dt	0.00	0.00
hay	5.00	dt	5.00	25.00
pasture services	8.00	months	7.00	56.00
veterinary costs	1.00		10.00	10.00
Total variable costs				491.00
Gross margin				509.00
Number of bulls	1.00	head		
Total gross margin (lei)				509.00

Profit and loss	lei			lei	
Maize	549.50		Operating overheads		
Wheat	175.50		Depreciation of fixed assets	0.00	
Apples	378.00		Wages of permanent workers	0.00	
Grapes	551.20		Taxes other than income tax	375.00	
Dairy	1,686.50		Rent	0.00	
Cattle for fattening	509.00		Other expenses	100.00	
Farm gross margin	3,849.70		Operating overheads	475.00	
Farm gross margin	3,849.70				
Operating overheads	-475.00				
<u>Operating farm profit</u>	<u>3,374.70</u>				

Source: Own calculations from case study; dairy calculation partly adapted from MANEN and BIEMANS (1996).

Use of agricultural output

	total farm output				on farm intermediate input				home consumption				market sales			
	quantity	unit	lei/unit	lei	quantity	unit	lei/unit	lei	quantity	unit	lei/unit	lei	quantity	unit	lei/unit	lei
Maize	20.00	dt	70.00	1,400.00	15.00	dt	70.00	1,050.00	3.50	dt	70.00	245.00	1.50	dt	70.00	105.00
Wheat	9.00	dt	50.00	450.00					7.00	dt	50.00	350.00	2.00	dt	50.00	100.00
Apples	11.40	dt	45.00	513.00					1.80	dt	45.00	81.00	9.60	dt	45.00	432.00
Grapes	16.00	dt	70.00	1,120.00					8.00	dt	70.00	560.00	8.00	dt	70.00	560.00
Milk	2,250.00	kg	1.00	2,250.00	50.00	kg	1.00	50.00	1,560.00	kg	1.00	1,560.00	640.00	kg	1.00	640.00
Old cow meat every 8 years	50.00	kg	3.00	150.00					50.00	kg	3.00	150.00	0.00	kg	3.00	0.00
Calves	0.90	head	100.00	90.00	0.625	head	100.00	62.50					0.275	head	100.00	27.50
Manure	40.00	dt	5.00	200.00	40.00	dt	5.00	200.00					0.00	dt	5.00	0.00
Meat	200.00	kg	5.00	1,000.00					200.00	kg	5.00	1,000.00	0.00	kg	5.00	0.00
Total				7,173.00				1,362.50				3,946.00				1,864.50

Source: Own calculations from case study.

Estimation of consumer basket and home consumption of a typical private farm household

Members of household

4.00 adult

Consumer basket of household					
Product	kg/head	kg/family	lei/kg	lei/head	lei/family
Meat, meat products	60.00	240.00	5.00	300.00	1,200.00
Milk, dairy products	130.00	520.00	3.00	390.00	1,560.00
Eggs (pieces)	290.00	1,160.00	0.35	101.50	406.00
Sugar	15.00	60.00	2.50	37.50	150.00
Vegetable oil	15.00	60.00	3.00	45.00	180.00
Cereal products	140.00	560.00	1.50	210.00	840.00
Potatoes	100.00	400.00	1.50	150.00	600.00
Vegetables, melons	160.00	640.00	1.00	160.00	640.00
Fruits	70.00	280.00	0.50	35.00	140.00
Grapes for wine production	200.00	800.00	0.70	140.00	560.00
Other foodstuff	100.00	400.00	1.00	100.00	400.00
Total food consumption				1,669.00	6,676.00
Non food items and services				1,500.00	6,000.00
Total non food consumption				1,500.00	6,000.00
Total living expenses				3,169.00	12,676.00

Amount taken from farm output				-4,090.00
Output of home gardening				-2,149.64
Living expenses net of in kind consumption and home gardening output				6,436.36

Source: Own calculations from case study.

Estimation of home consumption							
processing factor	need of raw material kg	amount taken from farm output kg	amount taken from farm output lei	assumed home gardening output kg	assumed home gardening output lei	residual balance kg/family	residual food expenditure lei/family
1.00	240.00	250.00	1,250.00	20.00	100.00	-30.00	-150.00
3.00	1,560.00	1,560.00	1,560.00	0.00	0.00	0.00	0.00
1.00	1,160.00	0.00	0.00	1,160.00	406.00	0.00	0.00
11.00	660.00	0.00	0.00	500.00	113.64	160.00	36.36
3.60	216.00	0.00	0.00	216.00	180.00	0.00	0.00
2.50	1,400.00	1,050.00	630.00	350.00	210.00	0.00	0.00
1.00	400.00	0.00	0.00	300.00	450.00	100.00	150.00
1.00	640.00	0.00	0.00	640.00	640.00	0.00	0.00
1.00	280.00	180.00	90.00	100.00	50.00	0.00	0.00
1.00	800.00	800.00	560.00	0.00	0.00	0.00	0.00
1.00	400.00	0.00	0.00	0.00	0.00	400.00	400.00
			4,090.00		2,149.64		436.36

Methodological note:

The consumer basket was set in accordance with the physical standards issued as minimum consumer basket by the government of Moldova (see UNDP 1996). Since this consumer basket consist of mostly processed goods, a processing factor was introduced in order to calculate the needed raw material. Therefore the value of 'amount taken from farm output' is slightly different from 'home consumption' in the 'Use of agricultural output' statement above. It was assumed that the raw material is taken from own production incl. home gardening as far as possible. The residual balance has to be met by the remaining living expenses. In contrast to the 'Use of agricultural output' statement, this table relates home consumption to the consumer basket (total household consumption) and not to agricultural output (total farm production).

Activity	Home gardening (HG)			
	quantity/ HG	unit	lei/unit	lei/HG
Receipts				
Meat poultry	20.00	kg	5.00	100.00
Eggs	1,160.00	pieces	0.35	406.00
Sugar beet	500.00	kg	0.23	113.64
Sunflower	216.00	kg	0.83	180.00
Cereals	350.00	kg	0.60	210.00
Potatoes	300.00	kg	1.50	450.00
Vegetables	640.00	kg	1.00	640.00
Fruits	100.00	kg	0.50	50.00
Gross income				2,149.64
Variable costs				
Flat rate				800.00
Total variable costs				800.00
Gross margin				1,349.64

Source: Own calculations from case study.

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